

South Carolina
Research Centers of Economic Excellence

Final Report of the On-Site Review Panel
2003-04 Funding Cycle

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SOUTH CAROLINA RESEARCH CENTERS OF ECONOMIC EXCELLENCE

REPORT OF THE ON-SITE REVIEW (2004)

I. Assessing the Program

The Research Centers of Economic Excellence program is exceptionally well conceived. The concept of investing in clusters of research excellence as a vehicle for economic development is one that has shown success when pursued with careful focus, thoughtful planning, and deliberate speed. Similarly, the emphasis on attracting eminent scholars as the nucleus for such centers is appropriate. Moreover, the idea of strengthening collaboration across universities responds effectively to the fact that the three institutions are comparatively small in the context of today's research environment and must share resources and expertise needed to secure a competitive scale.

The strategy of the first two years has been to allow proposals from the faculty to “bubble up” through campus processes to the state level, where external reviewers complete a comparative analysis and make recommendations to the program's board. Allowing proposals to move upwards through a series of competitions is a strategy that appears to have worked well in the first year. A relatively small number of clusters effectively demonstrated strong synergy between existing and potential academic excellence and the ability to create medium and long-term economic development for the state. The picture in Round Two (2004) was less clear. Looking across the three institutions there were relatively fewer proposals that clearly met the program's criteria—especially the ability to demonstrate academic competitiveness and economic benefit in the medium to long term.

Looking toward the third year (2005), the Review Panel suggests that the state consider a modification of the existing strategy. First, instead of continuing to allow programs to move up to the state level for final review, the Panel suggests that the three universities should advance only those proposals (in priority order) that clearly meet their strategic planning priorities and are likely to meet the economic goals of the program. A state level review process should still be employed, but with a role that focuses more on evaluating the comparative quality of institutional priorities and in providing advice on strategy. The current review process does an effective job of ranking, but does not serve the state as well as it could in offering scientific and strategic assistance. The Panel also feels strongly that building strong and nationally competitive programs will require funding across multiple years. The overall objective should be to concentrate resources on those programs that show the highest potential for advancing science, technology and economic development in South Carolina. This would require that previously funded programs be eligible in every round. It would also require the development of a statewide science infrastructure, including communications, computation, instrumentation, animal facilities, etc.

The Review Panel does not believe that the creation of a formal collaboration strategy should require a change to the guidelines or significant funding other than that already available; it would be a logical role for the Commission staff to undertake. Many effective strategies are already in place—notably in the collaboration between the two medical schools—and all three universities seem to understand and appreciate the benefits of working together in an active way. In developing a truly comprehensive collaboration strategy, South Carolina would be a leader. Some states, for example California, are already pushing ahead in sharing educational resources at the graduate level. Others, for example, Ohio, Indiana, Oregon, and California, are implementing very high speed data networks with the goal of sharing instrumentation and other resources. A synthesis of these strategies, together with fresh thinking from the universities and Commission staff and faculty, could help the state maximize the return on its investment in higher education.

II. The Review Process

The seven-member review panel convened on March 28, 2004, for a four-day on-site evaluation of 13 proposals submitted to the South Carolina Research Centers of Economic Excellence Review Board. Three members of the 2004 review panel were members of the previous year's (2003) panel. The review process began with a discussion of the legislative intent of the program and agreement on the mechanism of review that could be applied consistently and fairly to all proposals. During the on-site review, extensive discussions were held with the senior administration of the universities, the scientists and scholars responsible for the projects. In some cases, the panel interviewed private-sector partners involved in the projects. The deliberations of the Panel members are reflected in the rankings and comments in this report.

The criteria used by the on-site review team in evaluating proposals were:

1. Economic impact for South Carolina
2. Likelihood of success in meeting scientific and technical goals
3. Accessibility of technological infrastructure
4. Collaborations and partnerships
5. Ability to attract and retain top researchers
6. Ability to produce a talented workforce

The scientific and technical reviews provided to the Panel members were also taken into account. However, it was concluded by the Panel that these reports did not distinguish sufficiently between programs to be useful. This is a crucial component to the peer review process and should be retained, but improved, for the next round of funding.

Suggested Changes to the Paper (Technical) Review

- Add sections on strengths and weaknesses
- Drop the use of program recommended reviewers

- Require reviewers to sign document attesting to lack of conflict
- Provide a review report similar to NSF/NIH-style assessments

III. Review Results and Recommendations

The reviewed proposals were evaluated by the above outlined criteria and placed into one of three Tiers based on quality and probability for meeting the expectations and goals of the Research Centers for Economic Excellence. Tier 1 represents the proposals that were judged to be the best and therefore recommended for funding. Tier 2 represents proposals that were judged to be worthy of funding, but not of the same quality and promise as those of Tier 1. Proposals in Tier 3 have serious deficiencies and are not therefore recommended for funding.

TIER ONE: Highest priority for funding

Vehicle Electronic Systems Integration – Clemson University

Strengths:

- Strong demonstrated partnership with contributing companies (e.g., BMW, Michelin)
- Critical technology focus for automotive technology
- Potential for strong economic impact for the state
- Strong research collaborations building on existing research strengths in the institution (e.g., wireless communication)
- Making significant progress in developing their required match from the private sector

Issues and Concerns:

- Concern that the focus may be too applied (i.e., too industry-driven) and recommend that the group align the research plan with knowledge development goals that will increase their national visibility and opportunities for NSF funding (among other sources)
- Need to rethink their approach and develop a plan that focuses on recruiting the kind of person who will attract major federal competitive funding AND be able to attract investments from the automotive and related industries

Translational Cancer Therapeutics Center - MUSC and USC

Strengths:

- This is clearly a top proposal
- High strategic priority for MUSC and USC

- Effort to cover the spectrum of drug design and development into clinical trials
- Potential economic impact
- Fits among MUSC's three top priorities for research development
- Demonstrated track record in research funding and in working with industry
- Cost share is already developed and committed – and the budget is fine
- Private sector partnerships already in place
- Dr. Tew is an outstanding candidate for one of the endowed chairs
- Significant new hires recently and additional will occur, providing critical mass of people already on board
- This proposal and Tew's participation will be a major factor in achieving comprehensive center designation from the NCI – but they need to recruit a physician to cover the colon and hematology clinical research

Concerns:

- Needs to address teaching and training integrated with research programs
- Inadequate information on the approach to hiring the other endowed chair at USC (we will recommend a list of people in genetics)
- Lacks clear metrics of success

Photonic Materials – Clemson University

Strengths:

- The group has developed substantial momentum and the further expansion and investment they propose will sustain and accelerate the effort – and is likely essential
- Well organized proposal with strong, energetic and talented leadership
- Excellent community and industry buy-in
- Leadership will energize and accelerate it further
- Strong university leadership will have a positive impact
- The budgetary request is reasonable and justified

Issues and Concerns:

- Concern about the economic impact, particularly in the context of the steep competition across the US in academic institutions with longer lead times
- It is unlikely that industrial investment in photonics will develop in or relocate to South Carolina when this industrial sector has already made substantial capital investments, elsewhere, and they are going through a difficult time
- There are twenty or more photonics groups in the US that are bigger and better established than what is proposed here

Polymer Nanocomposite -- USC

Strengths:

- It is a major area of emphasis for USC

- Appears to have the necessary technology core elements in place
- Will complement the already significant polymer industry in South Carolina
- Endowed chair would complete the intellectual requirement for success
- Very well thought out economic development plan
- Appear to have a relationship with their industrial partners and have received an intellectual property transfer
- Well defined objectives and recognition of the importance/role of the industrial partners in bringing the research activities to economic fruition
- Has potential to provide both strong research and educational programs

Issues and Concerns

- Somewhat speculative plans but a risk well worth taking
- No real ties identified with the nanopolymers group (carbon nanotubes) at Clemson. This was considered a lost opportunity and deficit
- Lack of significant federal funding

Tier One proposals should be given equal consideration because they have each met the requirements of the program and are likely to be successful. There is a considerable gap between the overall quality and confidence of success in Tier One and Tier Two.

TIER TWO: Recommend that the following proposals be funded in rank order if monies are available.

1. Integrative Bioinformatics – MUSC
2. Fuel Cells – USC

The Tier Two proposals have some of the same positive characteristics as Tier One, but lack the overall potential for economic development. If these proposals are funded they will require special monitoring and consultation to enhance their opportunity for success.

Bioinformatics

Positive Aspects:

- Promising area that holds tremendous opportunities as a support function of many of the centers of excellence, program grants, etc.
- A strong program in this area would be vital for the long term viability of the institution (but this one isn't strong)
- Strong educational program, particularly integrating College of Charleston
- Track record on collaboration with other institutions

Concerns:

- Lacks a clear focus

- Cannot be developed as a stand alone discipline
- Haven't found or chosen a niche essential for competitiveness
- Presented a weak case for the adequacy of existing computation infrastructure (hardware and manpower appear inadequate to making this effort a resource to the institution)
- Endowment budget plan is unlikely to be successful in this highly competitive field
- Not an approach that will easily attract matching contributions
- Difficult to tie bioinformatics as a stand alone discipline to South Carolina economic growth – it will be indirect, as best
- Needs to be integrated into a solid research program, such as cancer research programs

Fuel Cells -- USC

Positive Aspects:

- Strong collaboration with Savannah River
- Significant ongoing research with possibility for broad and diverse collaborations
- IUCRC suggests strong industrial collaboration potential
- Strong faculty involvement
- Top 20 chemical engineering program
- Clearly a critical and strategic priority area for the university, the state and the nation

Issues and Concerns:

- Lack of details on hydrogen storage activity
- High risk technology for a 5-10 year time frame
- No specifics on near term objectives and milestones of the research program
- Critical contribution of the Endowed Chair to the research program was not well developed
- Unclear if there is a unique niche

TIER THREE: Do Not Fund (this is not a rank order) (*consider re-submitting)

Restoration Development* – Clemson
 Drug Discovery in Cancer* – MUSC
 Laser Lighting* – USC
 Implantable Biomaterials – USC
 Addictions – MUSC
 Vision – MUSC
 Tourism – USC

Tier Three proposals have serious deficiencies and the panel strongly recommends that these proposals not be funded.

Restoration Development – Clemson (recommend re-submission)

Strengths:

- Restoration is clearly going to be increasingly important at the state, national, and international levels
- They have identified potential partners in the City of Charleston
- They have many of the components in place to be a national center for restoration

Issues and Concerns:

- Caveat: we do not have sufficient expertise to evaluate the architecture and urban planning elements of the program, but we see that it is potentially a very important project for Clemson and the State of South Carolina and we have identified substantive concerns in the engineering areas where the expertise of the panel is strong
- The proposal did not demonstrate a connection to the engineering school and the materials sciences research faculty
- We are concerned that three chaired professors plus junior hires to round out an area is overly ambitious and an excessive investment in the proposed research area
- Recommend that they partner with the School of Building Arts in Charleston as a starting point and focus on restoration in Charleston
- Recommend that they study the North Carolina shoreline project to understand how best to pick the best restoration targets and develop restoration strategies and plans
- A resubmission should make clear the plan to establishment partnerships with the appropriate national, state, and local agencies and organizations (business, academic, and government) that will ensure that their program is well informed and realistically aligned

Laser Lighting – USC (recommend resubmission)

Strengths:

- Outstanding PI who is well recognized in field
- Strong collaboration plan and clear support of proposed collaborators
- Two spin-off companies
- Experienced research team
- Understanding that the key challenge is the materials
- Excellent infrastructure

Issues and Concerns:

- Significant disconnect between the proposal and the hiring plan described in the presentation
- Inadequate justification on need for an endowed chair focused on applications
- No special innovation in a plan that was very general
- The team's expertise is not in this area, which makes the focus on biophotonics unclear
- Low level of industry support
- Lack of clarity regarding the expertise and activities of the endowed chair
- Electronic reviewers note that "This is an outstanding problem that is being worked on by many very well-funded groups and companies with excellent reputations. It is the reviewer's firm believe that the only way this proposed center would effectively compete would be to have an approach which is substantially different than what is being pursued at the best R&D facilities in the world. In this reviewer's opinion, the case was not made in the project narrative."

Drug Discovery in Cancer – MUSC (recommend re-submission)

Strengths:

- Potential for important biological outcomes even if high impact drugs are not discovered or developed
- Solid technology infrastructure has been developed

Concerns and Issues:

- Group has chosen one of the most difficult research goals – drug discovery and development
- Very high risk
- No clear commercial partnership opportunities
- Lacks a coherent plan
- Recruitment of a first class structural biologist will require substantially higher investment than presented in the proposal
- Requires integration of an in silico approach to manage costs in a high risk program

Implantable Biomaterials -- USC

Strengths:

- A conceptually novel application of electrical engineering materials to an important medical problem
- A broadly interdisciplinary team

Issues and Concerns:

- Proposal lacks programmatic (i.e., NIH PO1) potential; it is more like an NIH RO1, type research activity
- Highly premature research program lacking proof of concept that this material is truly biologically inert
- No plan for raising required match
- Lack of institutional consultation on departmental location of the new Endowed Chair

Vision -- MUSC

Strengths:

- Proposal presents focus
- Storm Eye Center has a history of success

Concerns and Issues:

- Plan is not clear
- No evidence this will advance the institution's and the State's goals
- Unclear of Storm Eye Center's relative standing compared to other major vision research centers
- No convincing evidence of research success
- No plan for advancing commercialization and economic impact through strategic partnerships
- Collaboration is not substantive, is disconnected and appears tacked-on
- Unrealistic expectations of what it would take to support even one of the individuals if they are truly going to recruit someone from the top research echelons
- Not clear that there is a coherent plan for building on local expertise for advancing virus vector research
- Current funding levels of participating investigators are very modest and it is not clear what portion of that comes from competitive funding agencies

Addiction -- MUSC

Strengths:

- It is a strength area for the institutions and Kavelas is solid and a track record in this field
- It is an area where they could raise money
- It has both a clinical and a basic research component

Concerns and Issues:

- Plan is not clear

- No evidence that this will advance the institutions' and the State's goals
- Little evidence that strong collaborations are, indeed, in place. PI stated at the review that "collaborative details and collaborative plans are yet to be developed"
- Out of three endowed chairs, two are focused on more administrative or technical coordination activities rather than research leadership and collaboration
- Director of Addictions Center's responsibilities, as presented in the slide presentation, are weak and not characteristic of a research leader
- Strong concern about what the endowed chairs would be doing at the facilities besides providing a core service capability
- Public awareness promotion is stressed in the written proposal but Kavelas said they had no plan to undertake it
- Proposal presents a disjointed plan and appears little more than a patchwork of poorly related and poorly integrated activities

Travel and Tourism -- USC

Strengths:

- Tourism is clearly a major driver on the South Carolina economy and an area that is likely to expand in impact over time
- The School clearly has the strong and enthusiastic support of the relevant business community
- The School has already demonstrated leadership by convening an apparently highly successful conference engaging a broad spectrum of public and private sector stakeholders
- To the extent that it can be successfully developed and broadly adopted, the use of IT, communications, and networking technology holds very high potential for major, positive economic impact
- The applicants responded to many of the reviewer concerns of the previous iterations of this proposal and the proposed program is better focused and justified than last year

Issues and Concerns:

- No concrete plan for how they would connect with the end users (business community) in accessing information and driving needed change through development and adoption of new technology
- Proposal still is not clearly responsive to the Request for Proposals
- Recommendation: Although this proposal does not fit the science and engineering requirements of the SC Centers of Excellence Program, the review panel believes it presents an excellent opportunity for industry and the research program supported through some other mechanism is likely to have substantial impact and benefit for the travel and tourism industry in South Carolina